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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
MOHR, ERIC JOHN	
ART UNIT	**PAPER NUMBER**
4181	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/769,884	LARRIEU ET AL.	
	Examiner	Art Unit	
	Eric J. Mohr	4181	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

(a) TITLE OF THE INVENTION.
(b) CROSS-REFERENCE TO RELATED APPLICATIONS.
(c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
(d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
(e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
(f) BACKGROUND OF THE INVENTION.
    (1) Field of the Invention.
    (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
(g) BRIEF SUMMARY OF THE INVENTION.
(h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
(i) DETAILED DESCRIPTION OF THE INVENTION.
(j) CLAIM OR CLAIMS (commencing on a separate sheet).
(k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
(l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Process and Device for the Compression of Image Blocks in a Hierarchical Manner.

Drawings

1. The drawings are objected to because the flow charts diagrams do not contain descriptive text narrative of the action performed. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 3, 4, 7, 8, 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Proctor et al (US 6,072,830).

Consider claims 1 and 8, Proctor discloses a process and device for compression of a block of a size L x H of a sequence of images **(see column 9, lines 33-35 where Proctor breaks an image into square pieces)**, characterized in that it comprises, in a repetitive manner, for said block:

- a search step, in one of the images of the sequence of images, for the zone of L x H pixels that is the most similar to said block **(see column 12, lines 12-38 where Proctor discusses a block matching algorithm that finds a similar block with minimum distortion)**;

-a step of determination whether the resemblance between said zone and said block responds to predetermined criteria **(see column 12, lines 39-41 where Proctor discusses comparing the distortion from block comparison with a predetermined threshold)**;

- if said resemblance responds to said criteria, a step of storage of the motion vector which indicates the distance between the block and the most similar zone found **(column 12, lines 46-55 where Proctor discusses encoding the distortion vector if the distortion is below the predetermined threshold)**;

- if said resemblance does not respond to said criteria, and if the block does not have a predetermined minimum size, a step of cutting out said block into sub-blocks and a

supplemental repetition for each of said sub- blocks **(see column 12, lines 41-46 where Proctor discusses dividing the block and processing the sub-blocks in a similar manner if the distortion is above the predetermined threshold)**, and

- if said resemblance does not respond to said criteria, and if said block has a predetermined minimum size, a step of storage of the block in the course of which the block is compressed without reference to a reference image **(see column 13, lines 23-27 where Proctor discusses sending a block to be encoded if it has reached a minimum size and has not passed any of the predetermined thresholds)**.

Consider claim 3, Proctor discloses the search step to include searching in a plurality of images of the sequence of images, for the zone of L x H pixels the most similar to said block, and in the course of the storage step of the vector, one stores data representative of the image which comprise said zone **(see column 11, lines 13-34 where Proctor discusses comparing the current image block to a set of previously stored image blocks, and column 12, lines 46-55 where Proctor discusses encoding the distortion vector of the most similar block)**.

Consider claims 4 and 13, Proctor discloses searching only in the preceding image of the sequence of images, for the zone of L x H pixels the most similar to said block **(see column 10, lines 42-49 where Proctor discusses matching an image block with the corresponding preceding image block)**.

Consider claim 7, Proctor discloses that the predetermined criteria depend on the dimensions of the block in question **(see column 10, lines 9-10 and lines 39-41 where different thresholds are discussed correlating to different block sizes)**.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 2, 11, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Proctor as applied to claim 1 above, and further in view of J. Nieweglowski, T. Campbell, and P. Haavisto, "A novel video coding scheme based on temporal prediction using digital image warping," *Consumer Electronics, IEEE Transactions on*, vol. 39, pp. 141-150, 1993, referred to as Nieweglowski in this document.

Consider claims 2, Proctor discloses that in the course of the determination step, it is determined whether the resemblance between the closest matching zone and the current block responds to predetermined criteria **(see column 12, lines 39-41 where Proctor discusses comparing the distortion from block comparison with a predetermined threshold)**, and in the course of the step of storage of the vector, if said zone is the most closely resembling one **(column 12, lines 46-55 where Proctor discusses encoding the distortion vector if the distortion is below the predetermined threshold)**. Proctor does not explicitly disclose applying a transform to the current block before searching for the best matching zone, and saving the transformation data if the transformed block best matches a zone. Nieweglowski

discloses transforming image blocks to more closely match blocks from a previous frame and saving transform parameters in an existing codec **(see page 143, section 3)**.

Since both inventions are related to that of image compression using a system employing blocks, It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Proctor, and modify the block matching step to include the use of spatial image transformation techniques to more closely match the current block to previous blocks, as taught by Nieweglowski, thus reducing block artifacts, as discussed by Nieweglowski.

Consider claim 11, Proctor discloses the search step to include searching in a plurality of images of the sequence of images, for the zone of L x H pixels the most similar to said block, and in the course of the storage step of the vector (255), one stores data representative of the image which comprise said zone **(see column 11, lines 13-34 where Proctor discusses comparing the current image block to a set of previously stored image blocks, and column 12, lines 46-55 where Proctor discusses encoding the distortion vector of the most similar block)**.

Consider claim 12, Proctor discloses searching only in the preceding image of the sequence of images, for the zone of L x H pixels the most similar to said block **(see column 10, lines 42-49 where Proctor discusses matching an image block with the corresponding preceding image block)**.

6. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Proctor and Nieweglowski as applied to claim 2 above, and further in view of Chaddha et al (US 6,584,226).

Consider claim 14, Proctor and Nieweglowski disclose the process according to claim 2. It is not explicitly disclosed that the blocks are cut into two sub-blocks of the same dimensions. Chaddha discloses an example of block division in which a 4x4 block is divided into two 4x2 blocks **(see column 9, lines 36-49)**.

It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Proctor, and modify the cutting step to break each block into two equal sub-blocks, as taught by Chaddha, thus allowing the creation of a binary tree map for efficient encoding, as discussed by Chaddha **(see column 9, lines 50-63)**.

7. Claims 5, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Proctor as applied to claims 1, 3, and 4 above, and further in view of Chaddha et al (US 6,584,226).

Consider claims 5, 15, and 16, Proctor discloses the process according to claims 1, 3, and 4. Proctor does not explicitly disclose that the blocks are cut into two sub-blocks of the same dimensions. Chaddha discloses an example of block division in which a 4x4 block is divided into two 4x2 blocks **(see column 9, lines 36-49)**.

It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Proctor, and modify the cutting step to break each block

into two equal sub-blocks, as taught by Chaddha, thus allowing the creation of a binary tree map for efficient encoding, as discussed by Chaddha **(see column 9, lines 50-63)**.

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Proctor as applied to claim 1 above, and further in view of Shin et al (US 5,724,451).

Consider claim 6, Proctor discloses the process according to claim 1. Proctor does not explicitly disclose cutting a block into sub-blocks both horizontally and vertically and selecting the cut which optimizes the overall resemblance of the sub-blocks generated by each of said acts of cutting out, with zones of said images of the image sequence. Shin discloses simultaneously cutting an image block into horizontal and vertical segments **(see column 6, lines 6-10 and figure 1)**, after which the split producing the lowest distribution values is coded **(see column 7, lines 20-30 and figure 6)**.

It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Proctor, and modify the splitting and selection steps to split the blocks in multipe directions and retain the values from the split that best compares to a previous image, as taught by Shin, thus reducing step error, as discussed by Shin **(see column 3, lines 26-30)**.

9. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Proctor and further in view of Hu (US 6,757,429).

Consider claims 9 and 10, Proctor discloses an image compression method following all the steps of claim 1. Proctor does not explicitly disclose a decompression method for the encoded image output by this process. Hu discloses an image decompression process that reverses the steps of a compression process to reconstruct the originally encoded image **(see column 20, lines 25-27)**.

It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Proctor, and modify the image compression method to include a method of decompressing the encoded data stream, as taught by Hu, thus allowing the encoded image to be reconstructed, as discussed by Hu **(see column 20, lines 25-27)**.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Uz et al (US 5,682,204) discloses video encoding where an image block is encode with or without reference to another block based on a predetermined threshold.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric J. Mohr whose telephone number is (571) 270-

5140. The examiner can normally be reached on 7:30am-5pm M-Th, 7:30am-4pm Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nick Corsaro can be reached on (571) 272-7876. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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